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(54) **[Title of the Invention]** Food Product

(57) **[Abstract]**

[Problem to Be Solved] To provide a food product or the like that is useful in preventing, inhibiting the advancement of, or ameliorating, periodontal disease.

[Means for Solving the Problem] Arginine, arginine salts or arginine compounds are used for the food product or the like.

[Claims]

[Claim 1] A food product comprising arginine, an arginine salt or an arginine compound, which is useful in preventing, inhibiting the advancement of, or ameliorating, periodontal disease.

[Claim 2] The food product recited in claim 1, wherein the arginine composition is rapidly converted to arginine *in vivo* when ingested.

[Claim 3] The food product recited in claim 2, wherein the arginine composition is a peptide.

[Claim 4] The food product recited in claim 3, wherein the peptide is a soy-derived peptide.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention] The present invention relates to applications in which arginine, arginine salts or arginine compositions are used for the purpose of preventing or ameliorating disease. More specifically, it relates to the application of arginine, arginine salts or arginine compounds, which are useful in preventing, inhibiting the advancement of, or ameliorating, periodontal disease, in food products or the like.

[0002]

[Prior Art] Periodontal disease refers to irritation or degeneration of the tissue that surrounds and supports the teeth (gums, alveolar bone and the like). Periodontal disease generally begins as irritation of the gums, progresses to the periodontal tissues and transitions to alveolar pyorrhea. The most important causes are dental plaque and dental tartar. Indirect causes include oral breathing, poor tooth alignment, badly aligned bite and tooth grinding. Furthermore, food and nutrition, endocrine disorders, medical illnesses and the like are said to be involved. Gingivitis is irritation of the gums and is characterized by swelling, redness, discharge and bleeding. If treated early, it improves, but if left, the irritation progresses and becomes alveolar pyorrhea. Alveolar pyorrhea is a disease of chronic irritation of the periodontal tissues, which support the teeth, such as the gums, alveolar bone and the periodontal membrane, and is most often transitioned to from gingivitis. The principal symptoms are chronic gingivitis and pus from deep canals formed between the teeth and the gums (periodontal pockets) but as the disease progresses the alveolar bone is involved, the teeth are loosened, and teeth may fall out. Gingivitis is treated by removing dental plaque and dental tartar, but when irritation is acute, anti-microbials, anti-inflammatories and the like are given. As in the case of gingivitis, removal of dental plaque and dental tartar is important for the treatment of alveolar pyorrhea, but if the periodontal pockets are deep, re-occurrence is likely, and therefore surgical therapies such as gum resections are also performed. When teeth have been loosened, therapies such as fixation and extraction of the teeth are performed. In any case, once the transition has been made to alveolar pyorrhea, the original healthy state is not regained, and thus prevention or early treatment is extremely important. Periodontal disease is the next most common disease after cavities and it is said that as many as approximately two thirds of young people, approximately four fifths of middle-aged people and nine out of ten people over 65 years old suffer from this disease. Accordingly the prevention and treatment of periodontal disease is an extremely important problem to be solved.

[0003]

[Problems to Be Solved by the Invention] The basic treatment and prevention of periodontal disease is removal of dental tartar and dental plaque, but it is extremely difficult to do this completely. Furthermore, the fact that many adults currently suffer from this disease makes it clear that this alone is not always capable of preventing or ameliorating this disease. In addition, antibiotics,

anti-inflammatories and the like are given as drug therapies, but these are not satisfactory in terms of preventive and therapeutic effect.

[0004]

[Means for Solving the Problems] The present inventors discovered that ingestion of arginine, arginine salts or arginine compounds, is extremely effective in preventing, inhibiting the advancement of, or ameliorating, periodontal disease.

[0005]

[Technical Background of the Invention] Arginine is one type of basic amino acid contained in proteins. Arginine is used as a food or food additive, as a nutritional supplement or in order to improve the "texture" of processed fish meat. Furthermore, the glutamic acid salt of arginine is used as a food additive for the purpose of bringing out the flavor of green tea. In terms of applications for arginine in medicines, this is used in promoting liver function, in studies into pituitary function and the like.

[0006] In the present invention, when arginine, arginine salts or arginine compositions are ingested as food products or the like, they are useful in preventing disease, which is to say, in preventing, inhibiting the advancement of, or ameliorating, periodontal disease.

[0007] The arginine used in the present invention may be either arginine produced by hydrolysis of natural animal-derived or plant-derived proteins, or arginine produced by fermentation or chemical synthesis. Optical isomers of arginine include the D-form and the L-form, but in the present invention is preferable to use the L-form, which is the biological protein component (L-arginine; in the present invention, unless otherwise specified, arginine refers to L-arginine). Arginine may be used as-is or in the form of various salts. In terms of arginine salts, because arginine exhibits basic properties, salts with acids can primarily be used. The acids may be either inorganic acids or organic acids. Examples of inorganic acids include hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, hydrobromic acid, hydroiodic acid and the like. Examples of organic acids include formic acid, acetic acid, propionic acid, oxalic acid, succinic acid, maleic acid, fumaric acid, citric acid, glutamic acid, aspartic acid and the like.

[0008] The arginine composition used in the present invention may be any composition that can be rapidly converted to arginine *in vivo* when ingested, and examples of such compositions include peptides that have arginine as a constituent component (arginine peptides). Peptides comprise approximately 2 to 50 amino acids, but preferably, in the present invention, the arginine content is high, since ingestion [dosages are calculated] as converted to arginine, which is the active ingredient. For example, it is preferable that the arginine content in the peptide be at least 20 to 30%. In terms of the constituent components of the peptide, arginine is required, as it is the active ingredient, but there are no restrictions on the other types of amino acids. The peptide can be obtained by various

methods, such as chemical synthesis, fermentation, hydrolysis of natural proteins and [the use of] natural peptides, any of which may be employed. Examples of natural proteins include soy protein, and short chain arginine peptides that result from hydrolyzing this into peptides, chemically or by using enzymes according to ordinary methods, and purifying these by the ion exchange resin method or the like, are preferred for use in food products and the like, as they are inexpensive and can be supplied in large amounts. Furthermore, as short chain arginine peptides are superior to arginine in terms of flavor, stability, absorbance, safety and the like, they are particularly suitable for ingestion as food products or the like. When these arginine peptides are ingested as food products or the like, they are rapidly broken down *in vivo* and exhibit arginine activity.

[0009] Arginine, arginine salts or arginine compositions may be ingested as food products or the like in their original forms, or flavor enhancers, flavorants, additives and the like may be added in order to facilitate ingestion. In terms of the form, this can be any form that can ordinarily be used for food products and the like, such as powders, granules, fine particles, tablets, capsules, liquids, jellies and the like. Arginine, arginine salts or arginine compounds can be ingested by adding these to existing food products so that they are contained thereby. For example, these may be ingested by adding them to drinks, refreshing beverages, yogurt, candy, jellies, fermented milk drinks and the like, so that they are contained thereby.

[0010]

In the present invention, the arginine, arginine salts or arginine compositions may be ingested alone as a food product or the like, as an active ingredient for preventing or ameliorating disease, but in order to further increase the effect thereof, a preferred mode of ingestion is that of ingesting these together with cystine, vitamin E or the like, which are thought to act in an additive or synergistic manner with the action of arginine, arginine salts or arginine compositions.

[0011] The amount of arginine, arginine salts or arginine compositions ingested in the present invention should be adjusted according to the state of the disease and the patient's weight, age, constitution, condition and the like, but in general, this can be suitably selected within the range of 0.25 g to 30 g, and preferably 1 g to 20 g, per day, as converted to arginine. This can be ingested once daily or divided into several doses depending on the state of the disease and the form of food product or the like.

[0012]

[Embodiments] Hereafter, the present invention is described in more concrete terms, but the present invention is not limited thereby.

[0013]

[Embodiment 1] A suffered form multiyear, chronic gingivitis. The symptoms were swelling and redness of the gums, pus, bleeding at times such as when brushing the teeth and the like.

Treatments included brushing the teeth and removal of tartar, but no particular improvement was seen. Then, **A** ingested 4 to 10 g of edible arginine divided into 2 to 3 doses per day for 3 months, whereupon, in addition to improvements in the swelling and redness of the gums and the pus, there was an almost complete disappearance of bleeding at times such as when the teeth were brushed. There were no side effects whatsoever.

[0014]

[Effects of the Invention] The arginine, arginine salt or arginine composition of the present invention is useful in preventing, inhibiting the advancement of, or ameliorating periodontal disease, as a result of the ingestion thereof.

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